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L4: Entry 1 of 1 File: PGPB Feb 13, 2003

DOCUMENT-IDENTIFIER: US 20030033626 A1
TITLE: Manipulation of genes of the mevalonate and isoprenoid pathways to create novel traits in transgenic organisms

Detail Description Paragraph (21):
[0066] SEQ ID NO: 20) is a PCR primer containing Rhodobacter capsulatus DNA.

Detail Description Paragraph (56):
[0101] SEQ ID NO: 55) Rhodobacter capsulatus idiB (IPP isomerase).

Detail Description Paragraph (71):
[0116] SEQ ID NO: 71) is Rhodobacter capsulatus orf encoding phytoene synthase (crtB).

Detail Description Paragraph (163):
[0197] In a specific, exemplified embodiment, orfs encoding IPP isomerase are isolated and vectors containing an operon comprising orfs for the entire mevalonate pathway and an additional orf for IPP isomerase are constructed as follows: A Rhodobacter capsulatus orf encoding a polypeptide with IPP isomerase activity is isolated by PCR from genomic DNA (J. E. Hearst, Lawrence Berkeley Laboratories, Berkeley, Calif.) using the following primers:

Detail Description Paragraph (164):
[0198] containing the restriction sites XhoI shown underlined, BsaAI shown in bold, XhaI shown in italic, EcoRV shown double underlined, and NotI shown in bold italic. The PCR product is restricted with XhoI-XbaI, isolated by agarose gel electrophoresis, purified by GeneClean, and inserted into the XhoI-XbaI sites of pBluescript(SK+) by ligation to form pBSIDI. Sequence analysis is performed to identify the plasmids containing R. capsulatus DNA identical to the complementary sequence of base pairs 34678-34148, located on contig rc04 (Rhodobacter Capsulapedia, University of Chicago, Chicago, Ill.). Following restriction of pBSIDI with BsaAI-EcoRV, agarose gel electrophoresis and GeneClean purification, the 0.5 Kb BsaAI-EcoRV DNA fragment containing the R. capsulatus orf is inserted into the dephosphorylated SmaI site of pHKO3 by blunt-end ligation to create pHKO5 (FIG. 9). This establishes the isolation of a previously unknown and unique orf encoding R. capsulatus IPP isomerase.

Detail Description Paragraph (169):
[0202] In another exemplified embodiment, vectors containing open reading frames (orfs) encoding enzymes of the mevalonate pathway and IPP isomerase other than those described above are constructed. Polynucleotides derived from the yeast Saccharomyces cerevisiae, the plant Arabidopsis thaliana, and the bacteria Rhodobacter capsulatus and Streptomyces sp strain CL190 are used for the construction of vectors, including plastid delivery vehicles, containing orfs for biosynthesis of the encoded enzymes. Construction of the vectors is not limited to the methods described. One skilled in the art may choose alternative restriction sites, PCR primers, etc. to create analogous plasmids containing the same orfs or other orfs encoding the enzymes of the mevalonate pathway and IPP isomerase.

Detail Description Paragraph (215):
[0241] A Rhodobacter capsulatus orf encoding a polypeptide with phytoene synthase activity is isolated by PCR from genomic DNA using the primers

Detail Description Paragraph (260):
[0283] Hahn et al., "1-Deoxy-D-Xylulose 5-Phosphate Synthase, the Gene Product of Open Reading Frame (ORF) 2816 and ORF2895 in Rhodobacter capsulatus," J.

Detail Description Paragraph (264):
[0287] Hahn et al., "Open Reading Frame 176 in the Photosynthesis Gene Cluster of Rhodobacter capsulatus Encodes idi, a Gene for Isopentenyl Diphosphate Isomerase," J. Bacteriol. 178:619-624 (1996)

Detail Description Paragraph (277):
[0300] Kuzuyama et al., "Direct Formation of 2-C-Methyl-D-Erythritol 4-Phosphate by 1-Deoxy-D-Xylulose 5-Phosphate Reductoisomerase, a New Enzyme in the Non-Mevalonate Pathway to Isopentenyl Diphosphate," Tetrahedron Lett. 39:4509-4512 (1998)

Detail Description Paragraph (278):
[0301] Kuzuyama et al., "Fosmidomycin, a Specific Inhibitor of 1-Deoxy-D-Xylulose 5-Phosphate Reductoisomerase in the Nonmevalonate Pathway for Terpenoid Biosynthesis," Tetrahedron Lett. 39:7913-7916 (1998)

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Search Results - Record(s) 1 through 7 of 7 returned.

☐ 1. Document ID: US 20030073134 A1

L5: Entry 1 of 7 File: PGPB Apr 17, 2003

PGPUB-DOCUMENT-NUMBER: 20030073134
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030073134 A1

TITLE: Crystals and structures of 2C-methyl-D-erythritol 2,4-cyclodiphosphate synthase MECPS

PUBLICATION-DATE: April 17, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Louie, Gordon V.	San Diego	CA	US	
Buchanan, Sean Grant	Encinitas	CA	US	
Gajiwala, Ketan S.	San Diego	CA	US	
Sauder, J. Michael	San Diego	CA	US	

US-CL-CURRENT: 435/7.1; 702/19

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 20030033626 A1

L5: Entry 2 of 7 File: PGPB Feb 13, 2003

PGPUB-DOCUMENT-NUMBER: 20030033626
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030033626 A1

TITLE: Manipulation of genes of the mevalonate and isoprenoid pathways to create novel traits in transgenic organisms

PUBLICATION-DATE: February 13, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Hahn, Frederick M.	Paia	HI	US	
Kuehnle, Adelheid R.	Honolulu	HI	US	

US-CL-CURRENT: 800/278; 435/455, 536/23.6, 536/23.7, 800/288, 800/300

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

☐ 3. Document ID: US 20030003528 A1

L5: Entry 3 of 7 File: PGPB Jan 2, 2003

PGPUB-DOCUMENT-NUMBER: 20030003528
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030003528 A1

TITLE: Carotenoid production from a single carbon substrate

PUBLICATION-DATE: January 2, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Brzostowicz, Patricia C.	West Chester	PA	US	
Cheng, Qiong	Wilmington	DE	US	
Dicosimo, Deana	Rockland	DE	US	
Koffas, Mattheos	Wilmington	DE	US	
Miller, Edward S.	Wilmington	DE	US	
Odom, James M.	Kennett Square	PA	US	
Picataggio, Stephen K.	Landenberg	PA	US	
Rouviere, Pierre E.	Wilmington	DE	US	

US-CL-CURRENT: 435/67; 435/252.3

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 4. Document ID: US 20020197605 A1

L5: Entry 4 of 7 File: PGPB Dec 26, 2002

PGPUB-DOCUMENT-NUMBER: 20020197605
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020197605 A1

TITLE: Novel Polynucleotides

PUBLICATION-DATE: December 26, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Nakagawa, Satoshi	Tokyo		JP	
Mizoguchi, Hiroshi	Tokyo		JP	
Ando, Seiko	Tokyo		JP	
Hayashi, Mikiro	Tokyo		JP	
Ochiai, Keiko	Tokyo		JP	
Yokoi, Haruhiko	Tokyo		JP	
Tateishi, Naoko	Tokyo		JP	
Senoh, Akihiro	Tokyo		JP	
Ikeda, Masato	Tokyo		JP	
Ozaki, Akio	Hofu-shi		JP	

US-CL-CURRENT: 435/6; 435/287.2, 435/91.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 5. Document ID: US 6528289 B1

L5: Entry 5 of 7 File: USPT Mar 4, 2003

US-PAT-NO: 6528289
DOCUMENT-IDENTIFIER: US 6528289 B1

TITLE: Nucleotide sequence of the Haemophilus influenzae Rd genome, fragments thereof, and uses thereof

DATE-ISSUED: March 4, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fleischmann; Robert D.	Gaithersburg	MD		
Adams; Mark D.	N. Potomac	MD		
White; Owen	Gaithersburg	MD		
Smith; Hamilton O.	Towson	MD		
Venter; J. Craig	Potomac	MD		

US-CL-CURRENT: 435/91.41; 435/252.3, 435/320.1, 435/6, 536/23.1, 536/23.7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 6. Document ID: US 6506581 B1

L5: Entry 6 of 7 File: USPT Jan 14, 2003

US-PAT-NO: 6506581
DOCUMENT-IDENTIFIER: US 6506581 B1

TITLE: Nucleotide sequence of the Haemophilus influenzae Rd genome, fragments thereof, and uses thereof

DATE-ISSUED: January 14, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fleischmann; Robert D.	Gaithersburg	MD		
Adams; Mark D.	N. Potomac	MD		
White; Owen	Gaithersburg	MD		
Smith; Hamilton O.	Towson	MD		
Venter; J. Craig	Potomac	MD		

US-CL-CURRENT: 435/69.1; 435/252.3, 435/320.1, 435/69.3, 435/91.41, 536/23.7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 7. Document ID: US 6355450 B1

L5: Entry 7 of 7 File: USPT Mar 12, 2002

US-PAT-NO: 6355450
DOCUMENT-IDENTIFIER: US 6355450 B1

TITLE: Computer readable genomic sequence of Haemophilus influenzae Rd, fragments thereof, and uses thereof

DATE-ISSUED: March 12, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fleischmann; Robert D.	Gaithersburg	MD		
Adams; Mark D.	N. Potomac	MD		
White; Owen	Gaithersburg	MD		
Smith; Hamilton O.	Towson	MD		
Venter; J. Craig	Potomac	MD		

US-CL-CURRENT: 435/69.1; 435/252.3, 435/320.1, 435/851, 536/23.1, 536/23.7, 536/24.32, 536/24.33

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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Terms	Documents
reductoisomerase and rhodobacter	7

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Search Results - Record(s) 1 through 10 of 24 returned.

☐ 1. Document ID: US 20030073134 A1

L6: Entry 1 of 24 File: PGPB Apr 17, 2003

PGPUB-DOCUMENT-NUMBER: 20030073134
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030073134 A1

TITLE: Crystals and structures of 2C-methyl-D-erythritol 2,4-cyclodiphosphate synthase MECPS

PUBLICATION-DATE: April 17, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Louie, Gordon V.	San Diego	CA	US	
Buchanan, Sean Grant	Encinitas	CA	US	
Gajiwala, Ketan S.	San Diego	CA	US	
Sauder, J. Michael	San Diego	CA	US	

US-CL-CURRENT: 435/7.1; 702/19

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 20030054436 A1

L6: Entry 2 of 24 File: PGPB Mar 20, 2003

PGPUB-DOCUMENT-NUMBER: 20030054436
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030054436 A1

TITLE: STAPHYLOCOCCUS AUREUS POLYNUCLEOTIDES AND SEQUENCES

PUBLICATION-DATE: March 20, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
KUNSCH, CHARLES A.	GAITHERSBURG	MD	US	
CHOI, GIL A.	ROCKVILLE	MD	US	
BARASH, STEVEN C.	ROCKVILLE	MD	US	
DILLON, PATRICK J.	GAITHERSBURG	MD	US	
FANNON, MICHAEL R.	SILVER SPRING	MD	US	
ROSEN, CRAIG A.	LAYTONSVILLE	MD	US	

US-CL-CURRENT: 435/69.1; 435/252.3, 435/320.1, 536/23.1, 536/23.7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 3. Document ID: US 20030033626 A1

L6: Entry 3 of 24 File: PGPB Feb 13, 2003

PGPUB-DOCUMENT-NUMBER: 20030033626
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030033626 A1

TITLE: Manipulation of genes of the mevalonate and isoprenoid pathways to create novel traits in transgenic organisms

PUBLICATION-DATE: February 13, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Hahn, Frederick M.	Paia	HI	US	
Kuehnle, Adelheid R.	Honolulu	HI	US	

US-CL-CURRENT: 800/278; 435/455, 536/23.6, 536/23.7, 800/288, 800/300

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 4. Document ID: US 20030008326 A1

L6: Entry 4 of 24 File: PGPB Jan 9, 2003

PGPUB-DOCUMENT-NUMBER: 20030008326
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030008326 A1

TITLE: Nuclear magnetic resonance-docking of compounds

PUBLICATION-DATE: January 9, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Sem, Daniel S	San Diego	CA	US	
Pellecchia, Maurizio	San Diego	CA	US	

US-CL-CURRENT: 435/7.1; 436/173, 702/19

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 5. Document ID: US 20030003528 A1

L6: Entry 5 of 24 File: PGPB Jan 2, 2003

PGPUB-DOCUMENT-NUMBER: 20030003528
PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030003528 A1

TITLE: Carotenoid production from a single carbon substrate

PUBLICATION-DATE: January 2, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Brzostowicz, Patricia C.	West Chester	PA	US	
Cheng, Qiong	Wilmington	DE	US	
Dicosimo, Deana	Rockland	DE	US	
Koffas, Mattheos	Wilmington	DE	US	
Miller, Edward S.	Wilmington	DE	US	
Odom, James M.	Kennett Square	PA	US	
Picataggio, Stephen K.	Landenberg	PA	US	
Rouviere, Pierre E.	Wilmington	DE	US	

US-CL-CURRENT: 435/67; 435/252.3

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 6. Document ID: US 20020142422 A1

L6: Entry 6 of 24 File: PGPB Oct 3, 2002

PGPUB-DOCUMENT-NUMBER: 20020142422
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020142422 A1

TITLE: Moss genes from physcomitrella patens encoding proteins involved in the synthesis of amino acids, vitamins, cofactors, nucleotides and nucleosides

PUBLICATION-DATE: October 3, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Lerchl, Jens	Ladenburg		DE	
Renz, Andreas	Limburgerhof		DE	
Ehrhardt, Thomas	Speyer		DE	
Reindl, Andreas	Birkenheide		DE	
Cirpus, Petra	Mannheim		DE	
Bischoff, Friedrich	Mannheim		DE	
Frank, Markus	Ludwigshafen		DE	
Freund, Annette	Limburgerhof		DE	
Duwenig, Elke	Freiburg		DE	
Schmidt, Ralf-Michael	Kirrweiler		DE	
Reski, Ralf	Oberried		DE	

US-CL-CURRENT: 435/189; 435/320.1, 435/410, 435/69.1, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 7. Document ID: US 20020142408 A1

L6: Entry 7 of 24 File: PGPB Oct 3, 2002

PGPUB-DOCUMENT-NUMBER: 20020142408
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020142408 A1

TITLE: Production of cyclic terpenoids

PUBLICATION-DATE: October 3, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
DiCosimo, Deana J.	Rockland	DE	US	
Koffas, Mattheos	Wilmington	DE	US	
Odom, James M.	Kennett Square	PA	US	
Wang, Siqun	Wilmington	DE	US	

US-CL-CURRENT: 435/148; 435/166

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 8. Document ID: US 20020137190 A1

L6: Entry 8 of 24 File: PGPB Sep 26, 2002

PGPUB-DOCUMENT-NUMBER: 20020137190
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020137190 A1

TITLE: High growth methanotrophic bacterial strain

PUBLICATION-DATE: September 26, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Koffas, Mattheos	Wilmington	DE	US	
Odom, James M.	Kennett Square	PA	US	
Schenzle, Andreas	Zuerich		CH	

US-CL-CURRENT: 435/252.3; 435/190, 435/320.1, 435/69.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 9. Document ID: US 20020127623 A1

L6: Entry 9 of 24 File: PGPB Sep 12, 2002

PGPUB-DOCUMENT-NUMBER: 20020127623
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020127623 A1

TITLE: Biosensors, reagents and diagnostic applications of directed evolution

PUBLICATION-DATE: September 12, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Minshull, Jeremy	Menlo Park	CA	US	
Davis, S. Christopher	San Francisco	CA	US	
Welch, Mark	Fremont	CA	US	
Raillard, Sun Ai	Mountain View	CA	US	
Vogel, Kurt	Palo Alto	CA	US	
Krebber, Claus	Mountain View	CA	US	

US-CL-CURRENT: 435/7.92; 435/7.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 10. Document ID: US 20020108148 A1

L6: Entry 10 of 24 File: PGPB Aug 8, 2002

PGPUB-DOCUMENT-NUMBER: 20020108148
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020108148 A1

TITLE: Nucleic acid sequences to proteins involved in isoprenoid synthesis

PUBLICATION-DATE: August 8, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Boronat, Albert	Barcelona	MO	ES	
Campos, Narciso	Barcelona		ES	
Kishore, Ganesh M.	Creve Coeur		US	

US-CL-CURRENT: 800/284; 435/189, 435/320.1, 435/410, 435/69.1, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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Terms	Documents
reductoisomerase and (isoprenoid or carotenoid)	24

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WEST Search History

DATE: Monday, May 05, 2003

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT,PGPB,JPAB,EPAB,DWPI; PLUR=YES; OP=ADJ			
L7	L6 and l5	3	L7
L6	reductoisomerase and (isoprenoid or carotenoid)	24	L6
L5	reductoisomerase and rhodobacter	7	L5
L4	L1 and rhodobacter	1	L4
L3	reductoisomerase and rhobacter	0	L3
L2	L1 and rhobacter	0	L2
L1	1-deoxy-D-xylulose 5-phosphate reductoisomerase	11	L1

END OF SEARCH HISTORY

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COST IN U.S. DOLLARS                                SINCE FILE      TOTAL
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=> s 1-deoxy-D-xylulose 5-phosphate reductoisomerase and (dna or rna or nucleic  acid)
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L1          52 1-DEOXY-D-XYLULOSE 5-PHOSPHATE REDUCTOISOMERASE AND (DNA OR RNA
               OR NUCLEIC ACID)

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PROCESSING COMPLETED FOR L1
L2          34 DUP REM L1 (18 DUPLICATES REMOVED)

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L3           0 L2 AND 1990-1997/PY

=> s l2 and 1990-1998/py
   4 FILES SEARCHED...
L4           1 L2 AND 1990-1998/PY

=> d l4 ibib ab

L4   ANSWER 1 OF 1     MEDLINE
ACCESSION NUMBER:   1998374274     MEDLINE
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DOCUMENT NUMBER: 98374274 PubMed ID: 9707569
TITLE: A **1-deoxy-D-xylulose 5-phosphate reductoisomerase** catalyzing the formation of 2-C-methyl-D-erythritol 4-phosphate in an alternative nonmevalonate pathway for terpenoid biosynthesis.
AUTHOR: Takahashi S; Kuzuyama T; Watanabe H; Seto H
CORPORATE SOURCE: Institute of Molecular and Cellular Biosciences, University of Tokyo, Bunkyo-ku, Tokyo 113-0032, Japan.
SOURCE: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, **(1998 Aug 18)** 95 (17) 9879-84.
Journal code: 7505876. ISSN: 0027-8424.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-AB013300
ENTRY MONTH: 199809
ENTRY DATE: Entered STN: 19980925
Last Updated on STN: 20030124
Entered Medline: 19980917

AB Several eubacteria including Esherichia coli use an alternative nonmevalonate pathway for the biosynthesis of isopentenyl diphosphate instead of the ubiquitous mevalonate pathway. In the alternative pathway, 2-C-methyl-D-erythritol or its 4-phosphate, which is proposed to be formed from 1-deoxy-D-xylulose 5-phosphate via intramolecular rearrangement followed by reduction process, is one of the biosynthetic precursors of isopentenyl diphosphate. To clone the gene(s) responsible for synthesis of 2-C-methyl-D-erythritol 4-phosphate, we prepared and selected E. coli mutants with an obligatory requirement for 2-C-methylerythritol for growth and survival. All the **DNA** fragments that complemented the defect in synthesizing 2-C-methyl-D-erythritol 4-phosphate of these mutants contained the yaeM gene, which is located at 4.2 min on the chromosomal map of E. coli. The gene product showed significant homologies to hypothetical proteins with unknown functions present in Haemophilus influenzae, Synechocystis sp. PCC6803, Mycobacterium tuberculosis, Helicobacter pyroli, and Bacillus subtilis. The purified recombinant yaeM gene product was overexpressed in E. coli and found to catalyze the formation of 2-C-methyl-D-erythritol 4-phosphate from 1-deoxy-D-xylulose 5-phosphate in the presence of NADPH. Replacement of NADPH with NADH decreased the reaction rate to about 1% of the original rate. The enzyme required Mn2+, Co2+, or Mg2+ as well. These data clearly show that the yaeM gene encodes an enzyme, designated **1-deoxy-D-xylulose 5-phosphate reductoisomerase**, that synthesizes 2-C-methyl-D-erythritol 4-phosphate from 1-deoxy-D-xylulose 5-phosphate, in a single step by intramolecular rearrangement and reduction and that this gene is responsible for terpenoid biosynthesis in E. coli.

=> d his

(FILE 'HOME' ENTERED AT 13:32:16 ON 05 MAY 2003)

FILE 'MEDLINE, CAPLUS, BIOSIS, EMBASE, SCISEARCH' ENTERED AT 13:32:45 ON 05 MAY 2003

FILE 'MEDLINE, CAPLUS, BIOSIS, EMBASE, SCISEARCH' ENTERED AT 13:33:32 ON 05 MAY 2003

L1 52 S 1-DEOXY-D-XYLULOSE 5-PHOSPHATE REDUCTOISOMERASE AND (DNA OR R
L2 34 DUP REM L1 (18 DUPLICATES REMOVED)
L3 0 S L2 AND 1990-1997/PY

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L4             1 S L2 AND 1990-1998/PY

=> s 1-deoxy-D-xylulose 5-phosphate reductoisomerase and rhodobacter
L5             3 1-DEOXY-D-XYLULOSE 5-PHOSPHATE REDUCTOISOMERASE AND RHODOBACTER

=> dup rem l5
PROCESSING COMPLETED FOR L5
L6             3 DUP REM L5 (0 DUPLICATES REMOVED)

=> d l6 1-3

L6   ANSWER 1 OF 3  CAPLUS  COPYRIGHT 2003 ACS
AN   2002:256427  CAPLUS
DN   136:291001
TI   Bacterial genes for enzymes of isoprenoid biosynthesis and the engineering
     of isoprenoid metabolism
IN   Gokarn, Ravi; Jessen, Holly; Zidwick, Mary Jo
PA   Cargill Incorporated, USA
SO   PCT Int. Appl., 246 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
FAN.CNT 1
     PATENT NO.         KIND  DATE           APPLICATION NO.   DATE
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PI   WO 2002026933      A2    20020404       WO 2001-US30328   20010928
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             BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
PRAI US 2000-236580P   P     20000929

L6   ANSWER 2 OF 3  CAPLUS  COPYRIGHT 2003 ACS
AN   2001:115301  CAPLUS
DN   134:188989
TI   Metabolic pathways and enzymes in isoprenoid biosynthesis and their use in
     screening assays for inhibitors and herbicide resistance
IN   Bacher, Adelbert; Zenk, Meinhart; Eisenreich, Wolfgang; Fellermeier,
     Monika; Fischer, Markus; Hecht, Stefan; Herz, Stefan; Kis, Klaus; Luttgen,
     Holger; Rohdich, Felix; Sagner, Silvia; Schuhr, Christoph A.;
     Wungsintaweekul, Juraithip
PA   Germany
SO   PCT Int. Appl., 194 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
FAN.CNT 1
     PATENT NO.         KIND  DATE           APPLICATION NO.   DATE
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PI   WO 2001011055      A1    20010215       WO 2000-EP7548    20000803
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             IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV,
             MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE,
             SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA,
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     DE 10020996       A1   20010322       DE 2000-10020996 20000428
     EP 1198575        A1   20020424       EP 2000-949452   20000803
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PRAI DE 1999-19936663  A    19990804
     DE 1999-19945174  A    19990921
     DE 1999-19945175  A    19990921
     DE 1999-19948887  A    19991011
     DE 1999-19953309  A    19991105
     DE 2000-10020996  A    20000428
     WO 2000-EP7548    W    20000803
RE.CNT  8     THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
              ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6   ANSWER 3 OF 3  CAPLUS  COPYRIGHT 2003 ACS
AN   1999:673053  CAPLUS
DN   131:309853
TI   Process for producing isoprenoid compounds by transgenic microorganisms
     and method for detecting compounds having antibacterial or herbicidal
     activity
IN   Miyake, Koichiro; Hashimoto, Shinichi; Motoyama, Hiroaki; Ozaki, Akio;
     Seto, Haruo; Kuzuyama, Tomohisa; Takahashi, Shunji
PA   Kyowa Hakko Kogyo Co., Ltd., Japan
SO   PCT Int. Appl., 145 pp.
     CODEN: PIXXD2
DT   Patent
LA   Japanese
FAN.CNT 1
     PATENT NO.         KIND  DATE           APPLICATION NO.  DATE
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PI   WO 9953071          A1   19991021       WO 1999-JP1987   19990414
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             TJ, TM
         RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,
             PT, SE
     JP 2000300256      A2   20001031       JP 1999-104589   19990412
     JP 2000300257      A2   20001031       JP 1999-104590   19990412
     CA 2325798         AA   19991021       CA 1999-2325798  19990414
     AU 9931699         A1   19991101       AU 1999-31699    19990414
     EP 1072683         A1   20010131       EP 1999-913662   19990414
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, FI
PRAI JP 1998-103101    A    19980414
     JP 1998-221910    A    19980805
     JP 1999-35739     A    19990215
     WO 1999-JP1987    W    19990414
RE.CNT  9     THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
              ALL CITATIONS AVAILABLE IN THE RE FORMAT


=> d his

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     FILE 'MEDLINE, CAPLUS, BIOSIS, EMBASE, SCISEARCH' ENTERED AT 13:32:45 ON
     05 MAY 2003

     FILE 'MEDLINE, CAPLUS, BIOSIS, EMBASE, SCISEARCH' ENTERED AT 13:33:32 ON
     05 MAY 2003
L1            52 S 1-DEOXY-D-XYLULOSE 5-PHOSPHATE REDUCTOISOMERASE AND (DNA OR R
L2            34 DUP REM L1 (18 DUPLICATES REMOVED)
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L3              0 S L2 AND 1990-1997/PY
L4              1 S L2 AND 1990-1998/PY
L5              3 S 1-DEOXY-D-XYLULOSE 5-PHOSPHATE REDUCTOISOMERASE AND RHODOBACT
L6              3 DUP REM L5 (0 DUPLICATES REMOVED)

=> log y
COST IN U.S. DOLLARS                                SINCE FILE      TOTAL
                                                       ENTRY    SESSION
FULL ESTIMATED COST                                    46.51      51.33

STN INTERNATIONAL LOGOFF AT 13:40:27 ON 05 MAY 2003
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COST IN U.S. DOLLARS                                SINCE FILE      TOTAL
                                                       ENTRY    SESSION
FULL ESTIMATED COST                                     0.21       0.21

FILE 'MEDLINE' ENTERED AT 10:44:36 ON 05 MAY 2003

FILE 'CAPLUS' ENTERED AT 10:44:36 ON 05 MAY 2003
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FILE 'SCISEARCH' ENTERED AT 10:44:36 ON 05 MAY 2003
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FILE 'BIOTECHDS' ENTERED AT 10:44:36 ON 05 MAY 2003
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FILE 'AGRICOLA' ENTERED AT 10:44:36 ON 05 MAY 2003

=> s 1-deoxy-D-xylulose 5-phosphate reductoisomerase
L1          246 1-DEOXY-D-XYLULOSE 5-PHOSPHATE REDUCTOISOMERASE

=> dup rem l1
PROCESSING COMPLETED FOR L1
L2          137 DUP REM L1 (109 DUPLICATES REMOVED)

=> s l2 and rhodobacter
L3            4 L2 AND RHODOBACTER

=> dup rem l3
PROCESSING COMPLETED FOR L3
L4            4 DUP REM L3 (0 DUPLICATES REMOVED)

=> s l2 and escherichia
L5           78 L2 AND ESCHERICHIA

=> focus l5
PROCESSING COMPLETED FOR L5
L6           78 FOCUS L5 1-

=> d l4 1-4 ibib ab

L4   ANSWER 1 OF 4  CAPLUS  COPYRIGHT 2003 ACS
ACCESSION NUMBER:         2002:256427  CAPLUS
DOCUMENT NUMBER:          136:291001
TITLE:                    Bacterial genes for enzymes of isoprenoid biosynthesis
                          and the engineering of isoprenoid metabolism
INVENTOR(S):              Gokarn, Ravi; Jessen, Holly; Zidwick, Mary Jo
PATENT ASSIGNEE(S):       Cargill Incorporated, USA
SOURCE:                   PCT Int. Appl., 246 pp.
                          CODEN: PIXXD2
DOCUMENT TYPE:            Patent
LANGUAGE:                 English
FAMILY ACC. NUM. COUNT:   1
PATENT INFORMATION:
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PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002026933	A2	20020404	WO 2001-US30328	20010928

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: US 2000-236580P P 20000929

AB The invention provides methods and materials related to the prodn. of isoprenoids. Specifically, the invention provides cloned genes for enzymes of polyisoprenoid biosynthesis and the enzymes and cells expressing the cloned genes for use in the manuf. of isoprenoids such as enzyme Q10. Genes for the enzymes were cloned from Sphingomonas trueperi and **Rhodobacter** sphaeroides by PCR using primers derived from known genes for the enzymes. Construction of expression vectors and expression hosts is described. Specifically, hosts in which genes for enzymes that would draw isopentenyl pyrophosphate away from coenzyme Q10 biosynthesis are inactivated are described. Inactivation of any one of these genes increases the yield of coenzyme Q10.

L4 ANSWER 2 OF 4 BIOTECHDS COPYRIGHT 2003 THOMSON DERWENT AND ISI
ACCESSION NUMBER: 2002-14179 BIOTECHDS
TITLE: Substantially pure polypeptides having e.g., 1-deoxyxylulose-5-phosphate synthase activity, useful for the production of isoprenoids, especially CoQ(10); recombinant protein production, and vector expression in host cell for ioprenoid production
AUTHOR: GOKARN R; JESSEN H; ZIDWICK M J
PATENT ASSIGNEE: CARGILL INC
PATENT INFO: WO 2002026933 4 Apr 2002
APPLICATION INFO: WO 2000-US30328 29 Sep 2000
PRIORITY INFO: US 2000-236580 29 Sep 2000
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: WPI: 2002-416480 [44]

AB DERWENT ABSTRACT:
NOVELTY - Substantially pure polypeptides (I) comprising amino acid sequences which have a length and percent identity to the fully defined sequences S3, S39, S42 or S97, over the length, are new.

DETAILED DESCRIPTION - The point defined by the length and the percent identity in (I) is within the area defined by points A, B, C and D of the defined Figure 26 (See Figure), where point A (for S3, S39, S42 or S97) has co-ordinates (641,100), (333,100), (337,100) and (386,100), respectively, point B has co-ordinates (641,65), (333,65), (337,65) and (386,65), respectively, point C has co-ordinates (25,65) for all four sequences, and point D has co-ordinates (5,100) for all four sequences. INDEPENDENT CLAIMS are also included for the following: (1) an isolated nucleic acid (NA) (II) comprising a sequence having a length and a percent identity to the fully defined nucleobase sequence N1 over the length, where the point defined by the length and the percent identity is within the are defined by points A, B, C and D of the defined Figure 26 (See Figure), having coordinates (3626, 100), (3626, 65), (50, 65) and (12, 100), respectively; (2) an isolated NA (III) comprising a sequence having a length and a percent identity to the fully defined nucleobase sequence N2 over the length, where the point defined by the length and the percent identity is within the are defined by points A, B, C and D of Figure 26 having coordinates (1926, 100), (1926, 65), (50, 65) and (12, 100), respectively; (3) an isolated NA (IV) encoding a polypeptide

comprising a sequence having a length and a percent identity to S3 over the length as in (I) above; (4) an isolated NA (V) comprising a sequence having a length and a percent identity to the fully defined nucleobase sequence N37 over the length, where the point defined by the length and the percent identity is within the are defined by points A, B, C and D of Figure 26 having coordinates (1990, 100), (1990, 65), (50, 65) and (16, 100), respectively; (5) an isolated NA (VI) comprising a sequence having a length and a percent identity to the fully defined nucleobase sequence N38 over the length, where the point defined by the length and the percent identity is within the are defined by points A, B, C and D of Figure 26 having coordinates (1002, 100), (1002, 65), (50, 65) and (16, 100), respectively; (6) an isolated NA (VII) encoding a polypeptide comprising a sequence having a length and a percent identity to S39 over the length as in (I) above; (7) an isolated NA (VIII) comprising a sequence having a length and a percent identity to the fully defined nucleobase sequence N40 over the length, where the point defined by the length and the percent identity is within the are defined by points A, B, C and D of Figure 26 having coordinates (1833, 100), (1833, 65), (50, 65) and (16, 100), respectively; (8) an isolated NA (IX) comprising a sequence having a length and a percent identity to the fully defined nucleobase sequence N41 over the length, where the point defined by the length and the percent identity is within the are defined by points A, B, C and D of Figure 26 having coordinates (1014, 100), (1014, 65), (50, 65) and (16, 100), respectively; (9) an isolated NA (X) encoding a polypeptide comprising a sequence having a length and a percent identity to S42 over the length as in (I) above; (10) an isolated NA (XI) comprising a sequence having a length and a percent identity to the fully defined nucleobase sequence N95 over the length, where the point defined by the length and the percent identity is within the are defined by points A, B, C and D of Figure 26 having coordinates (2017, 100), (2017, 65), (50, 65) and (16, 100), respectively; (11) an isolated NA (XII) comprising a sequence having a length and a percent identity to the fully defined nucleobase sequence N96 over the length, where the point defined by the length and the percent identity is within the are defined by points A, B, C and D of Figure 26 having coordinates (1161, 100), (1161, 65), (50, 65) and (16, 100), respectively; (12) an isolated NA (XIII) encoding a polypeptide comprising a sequence having a length and a percent identity to S97 over the length as in (I) above; (13) an isolated NA (XIV) comprising a nucleic acid sequence of at least 12 nucleotides, where the isolated nucleic acid hybridizes under hybridization conditions to the sense or antisense strand of a nucleic acid molecule comprising a sequence N1,N2, N37, N38, N40, N41, N95 or N96; (14) making an isoprenoid (M1) comprises culturing a genetically modified cell comprising at least one exogenous nucleic acid that encodes one polypeptide, where the cell produces more of the isoprenoid than a comparable cell lacking at least one exogenous nucleic acid or comprises one genomic deletion; (15) a host cell comprising any of the NAs above; and (16) increasing (M2) production of CoQ(10) in a cell having endogenous decaprenyl diphosphate synthase (DDS) activity, comprises inserting a nucleic acid molecule encodes a: (a) polypeptide having DDS; or (b) polypeptide having 1-deoxyxylulose-5-phosphate synthase (DXS) activity.

BIOTECHNOLOGY - Preferred Nucleic Acid: Point B of (II), (V), (VIII) or (IX) may have coordinates (3626, 85), (1990,85), (1833,85) or (2017,85), respectively. Point C of (II) may have coordinates (100,65) or (50, 85), whereas point C of (V) may have coordinates (100, 55) or (50, 85). Furthermore, point D of (II) or (V) may have coordinates (15,100) or (20,100). Preferably, the nucleic acids (II), (III), (V), (VI), (VIII), (IX), (XI) and (XII) encode a polypeptide that has DXS activity (for (II) and (III)), DDS activity (for (V),(VI), (VIII) and (IX)) or **1-deoxy-D-xylulose 5-phosphate reductoisomerase** (DXR) activity for ((XI) and (XII). (XIV) is at least 50 nucleotides and encodes a polypeptide that may have DXS, DDS, or DXR activity. The NA of (II), (V),

(VIII) and (IX) are preferably those as set in N1, N37, N40, and N95. The NA of (IV), (VII), (X) and (XIII) encode polypeptides having DXS, DDS, DDS and DXR activity, respectively. Preferred Polypeptide: The polypeptides of S3, S39, S42 and S97 have DXS, DDS, DDS or DXR activity respectively. Preferred Host Cell: The host cell is prokaryotic, and can be **Rhodobacter**, Sphingomonas or Escherichia cells. The host cell comprises an exogenous nucleic acid that encodes a polypeptide having DDS, DXS, ODS, SDS, DXR, 4-diphosphocytidyl-2C-methyl-D-erythritol synthase, 4-diphosphocytidyl-2C-methyl-D-Erythritol kinase, or chorismate lyase activity. The host cell comprises an exogenous nucleic acid comprising an UbiC and LytB sequence, and a non-functional crtE, ppsR or ccoN sequences, where the exogenous nucleic acid is within a crtE, ppsR or ccoN locus of the cell. The host cell also comprises a genomic deletion, where the deletion comprises at least a portion of a crtE, ppsR or ccoN sequences, and where the host cell has a non-functional crtE, ppsR or a ccoN sequence. Preferred Method: In (M2) the nucleic acid molecule comprises (V)-(X) or (XIV). The production of CoQ(10) is increased at least about 5% as compared to a control cell lacking the inserted nucleic acid molecule. The cells used in the method are **Rhodobacter** or Sphingomonas, or a (highly) membranous bacterium. The method further comprises inserting a second nucleic acid molecule comprising a nucleotide sequence that encodes a polypeptide having DXS activity (for (a) of (M2)) or DDS activity (for (b) of (M2) in the cell. The second nucleic acid molecule also comprises (II), (III) or (IV). In (M1), the polypeptide is a UbiC or a LytB polypeptide. The polypeptide has DDS, DXS, ODS (undefined), SDS (undefined), DXR, 4-diphosphocytidyl-2C-methyl-D-erythritol synthase, 4-diphosphocytidyl-2C-methyl-D-Erythritol kinase, or chorismate lyase activity. The cell comprises a non-functional crtE, ppsR or ccoN sequence, along with a genomic deletion, where the deletion comprises at least a portion of a crtE, ppsR or ccoN sequence, and the cell comprises a non-functional crtE ppsR or ccoN sequence.

USE - The polypeptides are useful for the production of isoprenoids, especially CoQ(10). Expressing (I) which has 1-deoxyxylulose-5-phosphate synthase (DXS) activity or decaprenyl diphosphate synthase (DDS) activity is useful for increasing production of CoQ(10) in a cell having endogenous DDS activity (all claimed).

EXAMPLE - Bacterial genomic DNA was extracted from Sphingomonas trueperi cells and a polymerase chain reaction (PCR) was performed to isolate the nucleic acid that encodes a S. trueperi polypeptide having 1-deoxyxylulose-5-phosphate synthase (DXS) activity. Three degenerate forward PCR primers (F1, F2, and F3) and three degenerate reverse primers (R1, R2, and R3) were designed by comparing sequences of several clones that encode polypeptides having DXS activity. The primers were: (1) F1: 5'-RTKATTYTMAAYGAYAAYGAAATG-3'; (2) F2: 5'-TTTGAAGARYTVGGYWTTAACTA-3'; (3) F3: 5'-RCAYCARGCTTAYSCVCAYAA-3'; (4) R1: 5'-CGTGYTGYTCDGCRATHGCBAC-3'; (5) R2: 5'-TGYTCDGCRATHGCBACRTCRAA-3'; and (6) R3: 5'-GGSCCDATRTAGTTAAWRCC. After the PCR, a portion of each product was separated by gel electrophoresis. This revealed that the combination of F3 with R2 produced a nucleic acid molecule of 882 bp (known as F3R2 fragment). This fragment was purified and ligated into the pCRII-TOPO vector which was in turn inserted into E. coli TOP10 cells. Plasmid DNAs were obtained and sequenced; this revealed that the sequence of the F3R2 fragment aligned with sequences from other nucleic acid molecules that encode polypeptides having DXS activity. To obtain the complete coding sequence for the S. trueperi polypeptide having DXS activity, genome walking was performed. (246 pages)

L4 ANSWER 3 OF 4 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:115301 CAPLUS
DOCUMENT NUMBER: 134:188989
TITLE: Metabolic pathways and enzymes in isoprenoid biosynthesis and their use in screening assays for

inhibitors and herbicide resistance

INVENTOR(S): Bacher, Adelbert; Zenk, Meinhart; Eisenreich, Wolfgang; Fellermeier, Monika; Fischer, Markus; Hecht, Stefan; Herz, Stefan; Kis, Klaus; Luttgen, Holger; Rohdich, Felix; Sagner, Silvia; Schuhr, Christoph A.; Wungsintaweekul, Juraithip

PATENT ASSIGNEE(S): Germany

SOURCE: PCT Int. Appl., 194 pp.
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001011055	A1	20010215	WO 2000-EP7548	20000803
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
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DE 10020996	A1	20010322	DE 2000-10020996	20000428
EP 1198575	A1	20020424	EP 2000-949452	20000803
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				

PRIORITY APPLN. INFO.:
DE 1999-19936663 A 19990804
DE 1999-19945174 A 19990921
DE 1999-19945175 A 19990921
DE 1999-19948887 A 19991011
DE 1999-19953309 A 19991105
DE 2000-10020996 A 20000428
WO 2000-EP7548 W 20000803

AB The present invention relates to enzymic activity involved in isoprenoid biosynthesis as well as to inhibitors, notably herbicides, for enzymes in the biosynthesis of isoprenoids. More specifically, the present invention relates to screening methods for detecting such inhibitors, and to enzymically active proteins for performing said methods as well as purified isolated DNA coding for such proteins. Moreover, the present invention relates to novel inhibitors detectable by said screening methods as well as compns. and processes for inhibiting the synthesis of isoprenoids and for controlling the growth of organisms based on said inhibitors. The invention relates also to the development of inhibitor-resistant plant enzymes and plants, plant tissues, plant seeds and plant cells. Thus, isoprenoid biosynthesis is shown to proceed via: (1) 2C-methyl-D-erythritol 4-phosphate plus CTP conversion to 4-diphosphocytidyl 2C-methyl-D-erythritol (I) as catalyzed by 4-diphosphocytidyl-2C-methyl-D-erythritol synthase; (2) I plus ATP conversion to 4-diphosphocytidy-2C-methyl-D-erythritol 2-phosphate (II) via 4-diphosphocytidyl-2C-methyl-D-erythritol kinase; and (3) followed by conversion of II to 2C-methyl-D-erythritol 2,4-cyclopyrophosphate via 2C-Methyl-D-erythritol 2,4-cyclodiphosphate synthase. Genes ygbP, ychB, and ygbB encoding these enzymes are cloned from Escherichia coli, Arabidopsis thaliana, and tomato. The enzymes provide applications in screening for herbicidal inhibitors and for genetic engineering of herbicide resistance in plants.

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 4 OF 4 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1999:673053 CAPLUS
DOCUMENT NUMBER: 131:309853
TITLE: Process for producing isoprenoid compounds by transgenic microorganisms and method for detecting compounds having antibacterial or herbicidal activity
INVENTOR(S): Miyake, Koichiro; Hashimoto, Shinichi; Motoyama, Hiroaki; Ozaki, Akio; Seto, Haruo; Kuzuyama, Tomohisa; Takahashi, Shunji
PATENT ASSIGNEE(S): Kyowa Hakko Kogyo Co., Ltd., Japan
SOURCE: PCT Int. Appl., 145 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9953071	A1	19991021	WO 1999-JP1987	19990414
W: AU, BG, BR, CA, CN, CZ, HU, ID, IL, IN, KR, MX, NO, NZ, PL, RO, RU, SG, SI, SK, TR, UA, US, VN, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
JP 2000300256	A2	20001031	JP 1999-104589	19990412
JP 2000300257	A2	20001031	JP 1999-104590	19990412
CA 2325798	AA	19991021	CA 1999-2325798	19990414
AU 9931699	A1	19991101	AU 1999-31699	19990414
EP 1072683	A1	20010131	EP 1999-913662	19990414
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				

PRIORITY APPLN. INFO.:
JP 1998-103101 A 19980414
JP 1998-221910 A 19980805
JP 1999-35739 A 19990215
WO 1999-JP1987 W 19990414

AB Disclosed is a method for the prodn. of isoprenoid compds. by cultivating transgenic prokaryotes that have been transformed with the gene for (1) 1-deoxy-D-xylulose 5-phosphate synthetase; (2) farnesyl pyrophosphate synthetase; (3) exodeoxyribo-nuclease; (4) a defined protein; and/or (5) **1-deoxy-D-xylulose 5-phosphate reductoisomerase**. The transgenic prokaryotes are selected from Escherichia, **Rhodobacter**, or Erwinia. The isoprenoid compds. are useful for (1) the treatment of heart diseases or osteoporosis, hemostasis, prevention of cancer, immunopotentiation, etc. and (2) the prepn. of health foods, antifouling coatings, etc. A method for screening compds. for their antibacterial or herbicidal activity or herbicidal activity by detecting their inhibitory activity against the enzymes assocd. with the non-mevalonate pathway is also claimed. Isolation of the genes assocd. with the biosynthesis of isoprenoid compds. from Escherichia coli strain XL1-Blue and use of the genes to improve the yield of CoQ8 by transgenic E. coli DH5.alpha. were shown. The **Rhodobacter** sphaeroides counterparts of gene DXS were also provided.

REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> d 16 1-10 ibib ab

L6 ANSWER 1 OF 78 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:780314 CAPLUS
DOCUMENT NUMBER: 135:340826

TITLE: Method for the determination of **1-deoxy-D-xylulose 5-phosphate reductoisomerase** in microorganisms and cell cultures

INVENTOR(S): Bacher, Adelbert; Eisenreich, Wolfgang; Fellermeier, Monika; Hecht, Stefan; Herz, Stefan; Rohdich, Felix; Wungsintaweekul, Juraithip; Zenk, Meinhart H.

PATENT ASSIGNEE(S): Germany

SOURCE: Ger. Offen., 8 pp.
CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 10018368	A1	20011025	DE 2000-10018368	20000413

PRIORITY APPLN. INFO.: DE 2000-10018368 20000413

AB The invention concerns an assay for the detn. of **1-deoxy-D-xylulose 5-phosphate reductoisomerase** in microorganisms and plant cell cultures by using 1-deoxy-D-xylulose as substrate and a phosphorylation agent in the presence of a magnesium salt, sodium fluoride and glutathione. **1-Deoxy-D-xylulose 5-phosphate reductoisomerase** is detd. in genetically engineered E.coli; radiolabeled substrate can be used. Thus a reagent contained 50 mM Tris-HCl pH 7.4, 40 mM MgCl2, 40 mM ATP, 20 mM glutathione, 20 mM NaF, and 3.5 .mu.M [1,2-14C]1-deoxy-D-xylulose (24000 dpm) in 50 .mu.L including the sample. After incubation at 37.degree.C for 1 h paper chromatog. was performed; Rf values were detd. with a radioactivity reader.

L6 ANSWER 2 OF 78 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1998:680257 CAPLUS

DOCUMENT NUMBER: 130:22740

TITLE: Fosmidomycin, a specific inhibitor of **1-deoxy-D-xylulose 5-phosphate reductoisomerase** in the nonmevalonate pathway for terpenoid biosynthesis

AUTHOR(S): Kuzuyama, Tomohisa; Shimizu, Tomohiro; Takahashi, Shunji; Seto, Haruo

CORPORATE SOURCE: Institute of Molecular and Cellular Biosciences, University of Tokyo, Tokyo, 113-0032, Japan

SOURCE: Tetrahedron Letters (1998), 39(43), 7913-7916
CODEN: TELEAY; ISSN: 0040-4039

PUBLISHER: Elsevier Science Ltd.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Fosmidomycin (I) inhibited **1-deoxy-D-xylulose 5-phosphate reductoisomerase** in an alternative nonmevalonate pathway for terpenoid biosynthesis with IC50 of 8.2 nM. Inhibition occurred for both intact recombinant **Escherichia** coli and with the purified enzyme. I-mediated inhibition was mixed-type (competitive and noncompetitive).

REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 3 OF 78 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2000:401973 CAPLUS

DOCUMENT NUMBER: 133:39889

TITLE: Cloning, sequence and expression of plant **1-deoxy-D-xylulose 5**

-**phosphate reductoisomerase**

INVENTOR(S): Cahoon, Rebecca E.; Lee, Jian-Ming; Tao, Yong
PATENT ASSIGNEE(S): E.I. du Pont de Nemours and Company, USA
SOURCE: PCT Int. Appl., 63 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000034448	A1	20000615	WO 1999-US28616	19991203
W: AE, AL, AU, BA, BB, BG, BR, CA, CN, CR, CU, CZ, DM, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
EP 1135471	A1	20010926	EP 1999-965974	19991203
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				

PRIORITY APPLN. INFO.: US 1998-110865P P 19981204
WO 1999-US28616 W 19991203

AB This invention relates to an isolated nucleic acid fragment encoding an isopentenyl diphosphate biosynthetic enzyme, **1-deoxy-D-xylulose 5-phosphate reductoisomerase** (I). The cDNA and encoded amino acid sequences of I of corn, rice, soybean, and wheat are disclosed. The invention also relates to the construction of a chimeric gene encoding all or a portion of I, in sense or antisense orientation, wherein expression of the chimeric gene results in prodn. of altered levels of the I in a transformed host cell.

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 4 OF 78 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1998:358885 CAPLUS
DOCUMENT NUMBER: 129:149156
TITLE: Direct formation of 2-C-methyl-D-erythritol 4-phosphate from 1-deoxy-D-xylulose 5-phosphate by **1-deoxy-D-xylulose 5-phosphate reductoisomerase**, a new enzyme in the non-mevalonate pathway to isopentenyl diphosphate
AUTHOR(S): Kuzuyama, Tomohisa; Takahashi, Shunji; Watanabe, Hiroyuki; Seto, Haruo
CORPORATE SOURCE: Institute of Molecular and Cellular Biosciences, University of Tokyo, Tokyo, 113-0032, Japan
SOURCE: Tetrahedron Letters (1998), 39(25), 4509-4512
CODEN: TELEAY; ISSN: 0040-4039
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB 1-Deoxy-D-xylulose 5-phosphate is biotransformed to 2-C-methyl-D-erythritol 4-phosphate in a single step in the presence of NADPH by a new recombinant enzyme named **1-deoxy-D-xylulose 5-phosphate reductoisomerase** purified from **Escherichia** coli.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 5 OF 78 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:75249 CAPLUS
DOCUMENT NUMBER: 134:143855
TITLE: **1-Deoxy-D-xylulose-5-phosphate reductoisomerase** and 1-deoxy-D-xylulose-5-phosphate synthase assays and their use in herbicide identification
INVENTOR(S): Hain, Ruediger; Tietjen, Klaus-Guenther; Busch, Marco; Martin, William F.
PATENT ASSIGNEE(S): Bayer A.-G., Germany
SOURCE: Ger. Offen., 16 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 19935967	A1	20010201	DE 1999-19935967	19990730
US 6303365	B1	20011016	US 1999-449335	19991124
WO 2001009341	A2	20010208	WO 2000-EP7033	20000721
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
EP 1204756	A2	20020515	EP 2000-956253	20000721
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				

PRIORITY APPLN. INFO.: DE 1999-19935967 A 19990730
US 1999-449335 A 19991124
WO 2000-EP7033 W 20000721

AB The invention concerns cDNA encoding 1-deoxyxylulose-5-phosphate reductoisomerase from Arabidopsis thaliana and a procedure for identifying modulators of the activity of this enzyme as well as 1-deoxy-D-xylulose-5-phosphate synthase. The title enzyme assays comprise conversion of pyruvate and glyceraldehyde-3-phosphate to 1-deoxy-D-xylulose-5-phosphate with 1-deoxy-D-xylulose-5-phosphate synthase and the conversion of 1-deoxy-D-xylulose-5-phosphate to 2-C-methyl-D-erythritol-4-phosphate with 1-deoxyxylulose-5-phosphate reductoisomerase. The latter reaction occurs with oxidn. of NADPH to NADP. Some of the modulators of this reaction pathway may be useful as herbicides.

L6 ANSWER 6 OF 78 BIOTECHDS COPYRIGHT 2003 THOMSON DERWENT AND ISI
ACCESSION NUMBER: 2003-06349 BIOTECHDS
TITLE: New nucleic acid sequence encoding **1-deoxy-D-xylulose 5-phosphate reductoisomerase** from an eukaryotic source, useful for altering isoprenoid content and composition, and modulating disease resistance in plants; vector-mediated gene transfer and expression in host cell for transgenic plant construction
AUTHOR: BORONAT A; CAMPOS N; KISHORE G M
PATENT ASSIGNEE: BORONAT A; CAMPOS N; KISHORE G M
PATENT INFO: US 2002108148 8 Aug 2002
APPLICATION INFO: US 2001-987025 13 Nov 2001
PRIORITY INFO: US 2001-987025 13 Nov 2001; US 1999-129899 15 Apr 1999

DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: WPI: 2003-066660 [06]

AB DERWENT ABSTRACT:

NOVELTY - An isolated nucleic acid sequence (I) encoding **1-deoxy-D-xylulose 5-phosphate reductoisomerase** (DXR) from a eukaryotic source, or a nucleotide sequence (S) of 3400 bp encoding a polypeptide of 477 amino acids given in the specification, a polynucleotide comprising a sequence which is 70-95% identical to (S), a polynucleotide which hybridizes to (S) or its fragment, or complement of (I), is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following: (1) a DNA construct (II) comprising as operably associated components in the 5'-3' direction of transcription, a promoter functional in a plant cell, (I) and a transcriptional termination sequence; (2) a host cell (III) comprising (II); (3) a plant comprising (III); and (4) producing (IV) an isoprenoid compound of interest in a plant, by obtaining a transformed plant, the plant having and expressing in its genome, a primary construct comprising (I) operably linked to a transcriptional initiation region functional in a plant cell, and at least one secondary construct comprising a DNA sequence encoding a protein involved in the production of a particular isoprenoid operably linked to a transcriptional initiation region functional in a plant cell.

WIDER DISCLOSURE - Also disclosed are: (1) DXR polypeptides; (2) oligonucleotides which include partial or complete DXR encoding sequences; (3) plants, seeds and oils having modified isoprenoid content, by the expression of DXR; (4) variants of (I); and (5) fragments or variants of DXR polypeptides.

BIOTECHNOLOGY - Preferred Nucleic Acid: (I) is isolated from a plant source, preferably Arabidopsis. Preferred Cell: (III) is a plant cell.

USE - (II) is useful for altering (increasing or decreasing) the isoprenoid content in a plant, where (I) is in sense or antisense orientation, and also for increasing the non-mevalonate isoprenoid biosynthetic flux in cell from a host plant. (II) is also useful for modulating disease resistance in a plant. (IV) is useful for producing isoprenoids such as tocopherol, carotenoid, monoterpene, diterpene, or plastoquinone (claimed). (I) is useful for producing plants or plant parts including leaves, stems, roots, reproductive and seed with a modified content of tocopherols.

EXAMPLE - To define the 5'-region of the putative **1-deoxy-D-xylulose 5-phosphate reductoisomerase** (DXR) gene, the corresponding transcription start site was mapped by using the rapid amplification of cDNA ends (RACE) technique. Primers were designed on the basis of the alignment between the DXR from **Escherichia** coli and the amino acid sequence deduced from the Arabidopsis thaliana genomic clone. The first strand of cDNA was synthesized using RNA from A. thaliana seedlings as a template and the oligonucleotide DXR-GSP1 as primer. Two nested polymerase chain reaction (PCR) were carried out to amplify the 5' end of the mRNA. The downstream specific primers used for the first and second nested PCR were complementary to the regions extending from positions +530 to +550 (primer DXR-GSP2) and +456 to +475 (primer DXR-GSP3), respectively. Four clones corresponding to the major amplification product were sequenced and found to have the same 5' end, which corresponded to the adenine at position +1 in the genomic sequence of DXR. A cDNA containing the whole coding sequence of the Arabidopsis DXR was amplified by two consecutive PCR from a cDNA library derived from the A. thaliana (var. Columbia) cell suspension line T87. The reaction mixture for the first PCR was prepared in a final volume of 25 micro liters containing the DNA template. 0.5 micro M of the upstream primer DXR-34: 5'-CAAGAGTAGTAGTGCGGTTCTCTGG-3', corresponding to nucleotides +34 to +58 of the sequence, 0.5 micro M of the downstream primer DXR-E2: 5'-CAGTTTGGCTTGTTCGGATCACAG-3'. The amplification product was purified

and cloned into plasmid pBluescript SK+. The resulting plasmid was named pDXR-At. Thus, a cDNA clone encoding the entire A. thaliana DXR was obtained by PCR from a cDNA library using primers DXR-34 and DXR-E2 corresponding to the regions extending from positions +34 to +58 and +3145 to +3169 of the genomic sequence, respectively. The identity of the amplified cDNA was confirmed by DNA sequencing. The alignment of the cDNA and the genomic sequences showed that the A. thaliana DXR gene contained 12 exons and 11 introns which extended over a region of 3.2 kb and comprised a sequence of 3400 bp given in the specification. The cloned cDNA encoded a protein of 477 amino acid residues with a predicted molecular mass of 52 kDa. (19 pages)

L6 ANSWER 7 OF 78 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1999:667187 CAPLUS
DOCUMENT NUMBER: 131:350310
TITLE: Metabolic engineering of the terpenoid biosynthetic pathway of **Escherichia** coli for production of the carotenoids .beta.-carotene and zeaxanthin
AUTHOR(S): Albrecht, Manuela; Misawa, Norihiko; Sandmann, Gerhard
CORPORATE SOURCE: Biosynthesis Group, Botanical Institute, Goethe University, Frankfurt, D-60054, Germany
SOURCE: Biotechnology Letters (1999), 21(9), 791-795
CODEN: BILED3; ISSN: 0141-5492
PUBLISHER: Kluwer Academic Publishers
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Metabolic engineering of the early non-mevalonate terpenoid pathway of **Escherichia** coli was carried out to increase the supply of prenyl pyrophosphates as precursor for carotenoid prodn. Transformation with the genes dxs for over-expression of 1-deoxy-D-xylulose 5-phosphate synthase, dxr for **1-deoxy-D-xylulose 5-phosphate reductoisomerase** and idi encoding an isopentenyl pyrophosphate stimulated carotenogenesis up to 3.5-fold. Co-transformation of idi with either dxs or dxr had an additive effect on .beta.-carotene and zeaxanthin prodn. which reached 1.6 mg g-1 dry wt.
REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 8 OF 78 MEDLINE
ACCESSION NUMBER: 2000123893 MEDLINE
DOCUMENT NUMBER: 20123893 PubMed ID: 10631325
TITLE: Biosynthesis of terpenoids: **1-deoxy-D-xylulose-5-phosphate reductoisomerase** from **Escherichia** coli is a class B dehydrogenase.
AUTHOR: Radykewicz T; Rohdich F; Wungsintaweekul J; Herz S; Kis K; Eisenreich W; Bacher A; Zenk M H; Arigoni D
CORPORATE SOURCE: Lehrstuhl fur Organische Chemie und Biochemie, Technische Universitat Munchen, Lichtenbergstr. 4, D-85747, Garching, Germany.
SOURCE: FEBS LETTERS, (2000 Jan 14) 465 (2-3) 157-60.
Journal code: 0155157. ISSN: 0014-5793.
PUB. COUNTRY: Netherlands
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200002
ENTRY DATE: Entered STN: 20000309
Last Updated on STN: 20000309
Entered Medline: 20000218
AB 1-Deoxy-D-xylulose-5-phosphate is converted into 2-C-methyl-D-erythritol-4-phosphate by the catalytic action of **1-deoxy-D-xylulose-5-phosphate**

reductoisomerase (Dxr protein) using NADPH as cofactor. The stereochemical features of this reaction were investigated in in vitro experiments with the recombinant Dxr protein of **Escherichia** coli using (4R)- or (4S)-[4-(2)H(1)]NADPH as coenzyme. The enzymatically formed 2-C-methyl-D-erythritol-4-phosphate was isolated and converted into 1,2:3,4-di-O-isopropylidene-2-C-methyl-D-erythritol; NMR spectroscopic investigation of this derivative indicated that only (4S)-[4-(2)H(1)]NADPH affords 2-C-methyl-D-erythritol-4-phosphate labelled exclusively in the H(Re) position of C-1. Stereospecific transfer of H(Si) from C-4 of the cofactor identifies the Dxr protein of E. coli as a class B dehydrogenase.

L6 ANSWER 9 OF 78 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1999:673053 CAPLUS
DOCUMENT NUMBER: 131:309853
TITLE: Process for producing isoprenoid compounds by transgenic microorganisms and method for detecting compounds having antibacterial or herbicidal activity
INVENTOR(S): Miyake, Koichiro; Hashimoto, Shinichi; Motoyama, Hiroaki; Ozaki, Akio; Seto, Haruo; Kuzuyama, Tomohisa; Takahashi, Shunji
PATENT ASSIGNEE(S): Kyowa Hakko Kogyo Co., Ltd., Japan
SOURCE: PCT Int. Appl., 145 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9953071	A1	19991021	WO 1999-JP1987	19990414
W: AU, BG, BR, CA, CN, CZ, HU, ID, IL, IN, KR, MX, NO, NZ, PL, RO, RU, SG, SI, SK, TR, UA, US, VN, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
JP 2000300256	A2	20001031	JP 1999-104589	19990412
JP 2000300257	A2	20001031	JP 1999-104590	19990412
CA 2325798	AA	19991021	CA 1999-2325798	19990414
AU 9931699	A1	19991101	AU 1999-31699	19990414
EP 1072683	A1	20010131	EP 1999-913662	19990414
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				

PRIORITY APPLN. INFO.:
JP 1998-103101 A 19980414
JP 1998-221910 A 19980805
JP 1999-35739 A 19990215
WO 1999-JP1987 W 19990414

AB Disclosed is a method for the prodn. of isoprenoid compds. by cultivating transgenic prokaryotes that have been transformed with the gene for (1) 1-deoxy-D-xylulose 5-phosphate synthetase; (2) farnesyl pyrophosphate synthetase; (3) exodeoxyribo-nuclease; (4) a defined protein; and/or (5) **1-deoxy-D-xylulose 5-phosphate reductoisomerase**. The transgenic prokaryotes are selected from **Escherichia**, Rhodobacter, or Erwinia. The isoprenoid compds. are useful for (1) the treatment of heart diseases or osteoporosis, hemostasis, prevention of cancer, immunopotentiation, etc. and (2) the prepn. of health foods, antifouling coatings, etc. A method for screening compds. for their antibacterial or herbicidal activity or herbicidal activity by detecting their inhibitory activity against the enzymes assocd. with the non-mevalonate pathway is also claimed. Isolation of the genes assocd. with the biosynthesis of isoprenoid compds. from **Escherichia** coli strain XL1-Blue and use of the genes to improve the yield of CoQ8 by transgenic E. coli DH5.alpha. were shown.

The Rhodobacter sphaeroides counterparts of gene DXS were also provided.
REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 10 OF 78 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
ACCESSION NUMBER: 2000:95738 BIOSIS
DOCUMENT NUMBER: PREV200000095738
TITLE: Biosynthesis of terpenoids: **1-Deoxy-D-xylulose-5-phosphate reductoisomerase** from **Escherichia** coli is a class B dehydrogenase.
AUTHOR(S): Radykewicz, Tanja; Rohdich, Felix; Wungsintaweekul, Juraithip; Herz, Stefan; Kis, Klaus; Eisenreich, Wolfgang; Bacher, Adelbert; Zenk, Meinhart H.; Arigoni, Duilio (1)
CORPORATE SOURCE: (1) Laboratorium fur Organische Chemie, ETH Zurich, Universitatsstr. 16, CH-8092, Zurich Switzerland
SOURCE: FEBS Letters, (Jan. 14, 1999) Vol. 464, No. 2-3, pp. 157-160.
ISSN: 0014-5793.
DOCUMENT TYPE: Article
LANGUAGE: English
SUMMARY LANGUAGE: English
AB 1-Deoxy-D-xylulose-5-phosphate is converted into 2-C-methyl-D-erythritol-4-phosphate by the catalytic action of **1-deoxy-D-xylulose-5-phosphate reductoisomerase** (Dxr protein) using NADPH as cofactor. The stereochemical features of this reaction were investigated in in vitro experiments with the recombinant Dxr protein of **Escherichia** coli using (4R)- or (4S)-(4-2H1)NADPH as coenzyme. The enzymatically formed 2-C-methyl-D-erythritol-4-phosphate was isolated and converted into 1,2:3,4-di-O-isopropylidene-2-C-methyl-D-erythritol; NMR spectroscopic investigation of this derivative indicated that only (4S)-(4-2H1)NADPH affords 2-C-methyl-D-erythritol-4-phosphate labelled exclusively in the HRe position of C-1. Stereospecific transfer of HSi from C-4 of the cofactor identifies the Dxr protein of E. coli as a class B dehydrogenase.

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(FILE 'HOME' ENTERED AT 10:43:53 ON 05 MAY 2003)

FILE 'MEDLINE, CAPLUS, BIOSIS, EMBASE, SCISEARCH, BIOTECHDS, AGRICOLA'
ENTERED AT 10:44:36 ON 05 MAY 2003
L1 246 S 1-DEOXY-D-XYLULOSE 5-PHOSPHATE REDUCTOISOMERASE
L2 137 DUP REM L1 (109 DUPLICATES REMOVED)
L3 4 S L2 AND RHODOBACTER
L4 4 DUP REM L3 (0 DUPLICATES REMOVED)
L5 78 S L2 AND ESCHERICHIA
L6 78 FOCUS L5 1-

=> log y

COST IN U.S. DOLLARS	SINCE FILE ENTRY	TOTAL SESSION
FULL ESTIMATED COST	56.91	57.12
DISCOUNT AMOUNTS (FOR QUALIFYING ACCOUNTS)	SINCE FILE ENTRY	TOTAL SESSION
CA SUBSCRIBER PRICE	-6.51	-6.51

STN INTERNATIONAL LOGOFF AT 10:49:43 ON 05 MAY 2003